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Département à
La Haye
Division de la
recherche

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Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°.

01126200.3

Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire

FUJITSU LIMITED

COMMUNICATION

The European Patent Office herewith transmits

- ☒ the European search report
- ☐ the declaration under Rule 45 EPC
- ☐ the partial European search report under Rule 45 EPC
- ☐ the supplementary European search report concerning the international application under Article 157(2) EPC relating to the above-mentioned European patent application. Copies of the documents cited in the search report are enclosed.

The following specifications given by the applicant have been approved by the Search Division :

- ☒ Abstract ☒ Title ☒ Figure
- ☐ The abstract was modified by the Search Division and the definitive text is attached to this communication.
- ☐ The following figure will be published with the abstract, since the Search Division considers that it better characterises the invention than the one indicated by the applicant.
- Figure:
- ☐ Additional copy(copies) of the documents cited in the European search report.

REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 517 754 A (BEILSTEIN JR KENNETH E ET AL) 21 May 1996 (1996-05-21) * column 5, line 44 - column 6, line 6 * * column 6, line 31 - column 6, line 34 *	1,2	H01L21/56 H01L21/60 H01L23/28 B29C43/18
Y	* column 11, line 3 - column 11, line 13; figures 1,26,27 *	3	H01L23/31 H05K3/30 H05K3/34
Y	EP 0 427 151 A (MICRON TECHNOLOGY INC) 15 May 1991 (1991-05-15) Abstract; Figure 1	3	H01L23/498 H01L23/495
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 288 (E-358), 15 November 1985 (1985-11-15) -& JP 60 130129 A (NIPPON DENKI KK), 11 July 1985 (1985-07-11) * abstract *	1-3	
✓ X	EP 0 704 896 A (NIPPON ELECTRIC CO) 3 April 1996 (1996-04-03) * column 5, line 11 - column 8, line 40; figures 2-7 *	4,5,7,8	
Y		9,16,17, 26-36,39	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
✓ X	EP 0 684 641 A (NIPPON ELECTRIC CO) 29 November 1995 (1995-11-29) * column 4, line 51 - column 12, line 51; figures 2,4 *	4-8	H01L H05K
Y		9,26-31	
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		-/--	
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 22 May 2003	Examiner Cousins, D
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
✓ X	US 5 309 021 A (SHIBATA JUN ET AL) 3 May 1994 (1994-05-03)	10-13, 15,23,24	
Y	* See complete document *	14,16,17	
✓ X	US 5 302 849 A (CAVASIN DANIEL) 12 April 1994 (1994-04-12) * column 2, line 54 - column 6, line 40; figures 1-4 *	10-13, 16,17,23	
✓ X	US 5 157 480 A (MC SHANE MICHAEL B ET AL) 20 October 1992 (1992-10-20) * column 2, line 52 - column 7, line 4; figures 1-7 *	10,14 ✓	
✓ Y	US 5 258 577 A (CLEMENTS JAMES R) 2 November 1993 (1993-11-02) * column 3, line 31 - column 5, line 35; figures 1-4 *	26-31	
✓ Y	US 5 363 277 A (TANAKA OSAMU) 8 November 1994 (1994-11-08) * See complete document *	32-36,39	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
✓ Y	US 5 128 746 A (PAPAGEORGE MARC V ET AL) 7 July 1992 (1992-07-07) * column 3, line 6 - column 3, line 56 *	32,39	
2 The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 22 May 2003	Examiner Cousins, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1 - 3

Claims 1-3 relate to a method for manufacturing a wiring board wherein a semiconductor device comprising a semiconductor element having protruding electrodes formed at an edge thereof, a resin seal, and (further) external connection protruding electrodes on said protruding electrodes, said semiconductor device being vertically mounted on a mounting board.

2. Claims: 4 - 6

Claims 4-6 relate to a method for manufacturing a wiring board comprising providing a semiconductor element which has protruding electrodes, a resin seal, and an interposer having outer connection means.

3. Claims: 7 - 9

Claims 7-9 relate to a semiconductor device having a semiconductor element with protruding electrodes functioning as external connection terminals, a wiring board having a flexible base with leads formed thereon, a resin seal, the leads including laterally extending portions, and the protruding electrodes formed on the extending portions.

4. Claims: 10 - 25

Claims 10-25 relate to a semiconductor device (claims 10-17) having one or more semiconductor elements, a resin seal, and an electrode plate buried in the resin and having portions laterally exposed functioning as external connection electrodes. Mounting arrangements therefor (claims 23-25). Claims 18-22 relate to a method for fabricating a semiconductor device having laterally exposed portions of an electrode plate.

5. Claims: 26 - 31

Claims 26-31 relate to a resin sealed semiconductor element (claims 26-30) attached to an interposer by an anisotropic conductive film and a fabrication method (claim 31).

6. Claims: 32 - 39

Claims 32-39 relate to a resin sealed semiconductor element (claims 32-38) attached to an interposer by an adhesive film, and a fabrication method therefor (claim 39).



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

A method for manufacturing a wiring board wherein a semiconductor device comprising a semiconductor element having protruding electrodes formed at an edge thereof, a resin seal, and (further) external connection protruding electrodes on said protruding electrodes is known from D1 (US-A-5 517 754). The features of the inventions 1 - 6 do not present a common inventive concept in view of this prior art.

The concept of an interposer (or electrode plate, or lead frame) is variously known in the present technical field in combination with resin sealed packages, see D3 (JP-A-06 130 129).

The application has been divided into the above (groups of) inventions which individually are considered to meet the requirement of unity. If additional fees are paid for (one or more of) the, as yet, unsearched invention(s), the subsequent search(es) might reveal prior art which leads to a finding of lack of unity a posteriori within (one or more of) the, as yet, unsearched invention(s). Should this be the case, as a rule, no further invitation to pay additional fees will be issued. Only the first identified invention in each group of inventions, for which additional search fees have been paid in due time and which subsequently is considered to lack unity, will be searched.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 01 12 6200

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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